DECLARATION

SITE NAME AND LOCATION

Eau Claire Municipal Well Field
Eau Claire, Wisconsin

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Eau Claire Municipal Well Field site developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and consistent with the National Oil and Hazardous Substances Pollution Contingency Plan to the extent practicable.

This decision is based upon the contents of the administrative record for the Eau Claire Municipal Well Field site.

The State of Wisconsin has concurred with the selected remedy.

DESCRIPTION OF THE SELECTED REMEDY

The final groundwater remedy for the site was developed to protect public health and the environment by preventing ingestion and inhalation of contaminants found in the groundwater, and by restoring the contaminated aquifer.

The major components of the selected remedy are as follows:

- Treat contaminated municipal water with an existing air stripper;
- Provide municipal water to private well users within or near the area of groundwater contamination;
- Install groundwater extraction wells in the plumes of contamination; and
- Discharge untreated groundwater from extraction wells to the Chippewa River.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State applicable or relevant and appropriate requirements, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment to the maximum extent practicable for this site. However, because treatment of the principal threats of the site was not found to be practicable and cost-effective, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy.

This remedy involves groundwater restoration, therefore the remedy will not result in hazardous substances remaining onsite above health-based levels.

3/31/88
Date

for Valdas V. Adamkus
Regional Administrator
U.S. EPA, Region V

DECISION SUMMARY

Eau Claire Municipal Well Field Site

I. SITE NAME, LOCATION, AND DESCRIPTION

The City of Eau Claire is located in northwestern Eau Claire County and southwestern Chippewa County, Wisconsin, at the confluence of the Eau Claire River and the Chippewa River. The Eau Claire Municipal Well Field (ECMWF) site is located in the northwest corner of Eau Claire on the east bank of the Chippewa River (Figure 1). The municipal well field, a 500 acre site, supplies drinking water to approximately 57,600 residents and numerous commercial establishments in the City of Eau Claire and Washington Township. The ECMWF is divided into north and south sections with nine wells developed in the north well field and five wells developed in the south well field. All wells are set in the glacial outwash sand and gravel aquifer. In addition, a number of private wells also draw from this sand and gravel aquifer. The aquifer is hydraulically connected to the underlying sandstone aquifer, which is not used due to its low hydraulic conductivity.

Groundwater from five municipal wells in the north well field is contaminated with volatile organic compounds (VOCs). The contamination at the ECMWF site has been characterized as two separate plumes. There is a plume at the municipal well field (Plume 1) and another upgradient of the well field (Plume 2). These plumes are shown in Figure 2.

Sources of natural recharge to the aquifers are local precipitation and infiltration of flood waters along river terraces. The Chippewa River is not believed to be affected by this contamination since pumping of the municipal wells prevents discharge of groundwater into the river.

Land use in the vicinity of the well field consists of light industry east of the airport and residential areas east and south of the well field.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

In March 1981, as part of the U.S. Environmental Protection Agency (U.S. EPA) Groundwater Supply Survey, the Wisconsin Department of Natural Resources (WDNR) tested the Eau Claire municipal water supply for VOCs. The following four organic compounds were identified in the municipal water supply: 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane, and trichloroethene. The WDNR informed the city that none of the compounds were detected in the finished water at levels to be of immediate concern.

In light of the EPA groundwater survey, the WDNR district office conducted additional testing in January 1982, of the city's active production wells. The samples from all but one well reported VOC concentrations at low or trace levels. Two of the wells sampled (Wells 11 and 15) exceeded Wisconsin health advisories for potable water supplies for 1,1-dichloroethene. However, due to the blending of clean water from the other wells, the contamination in the finished water was below the health advisories.

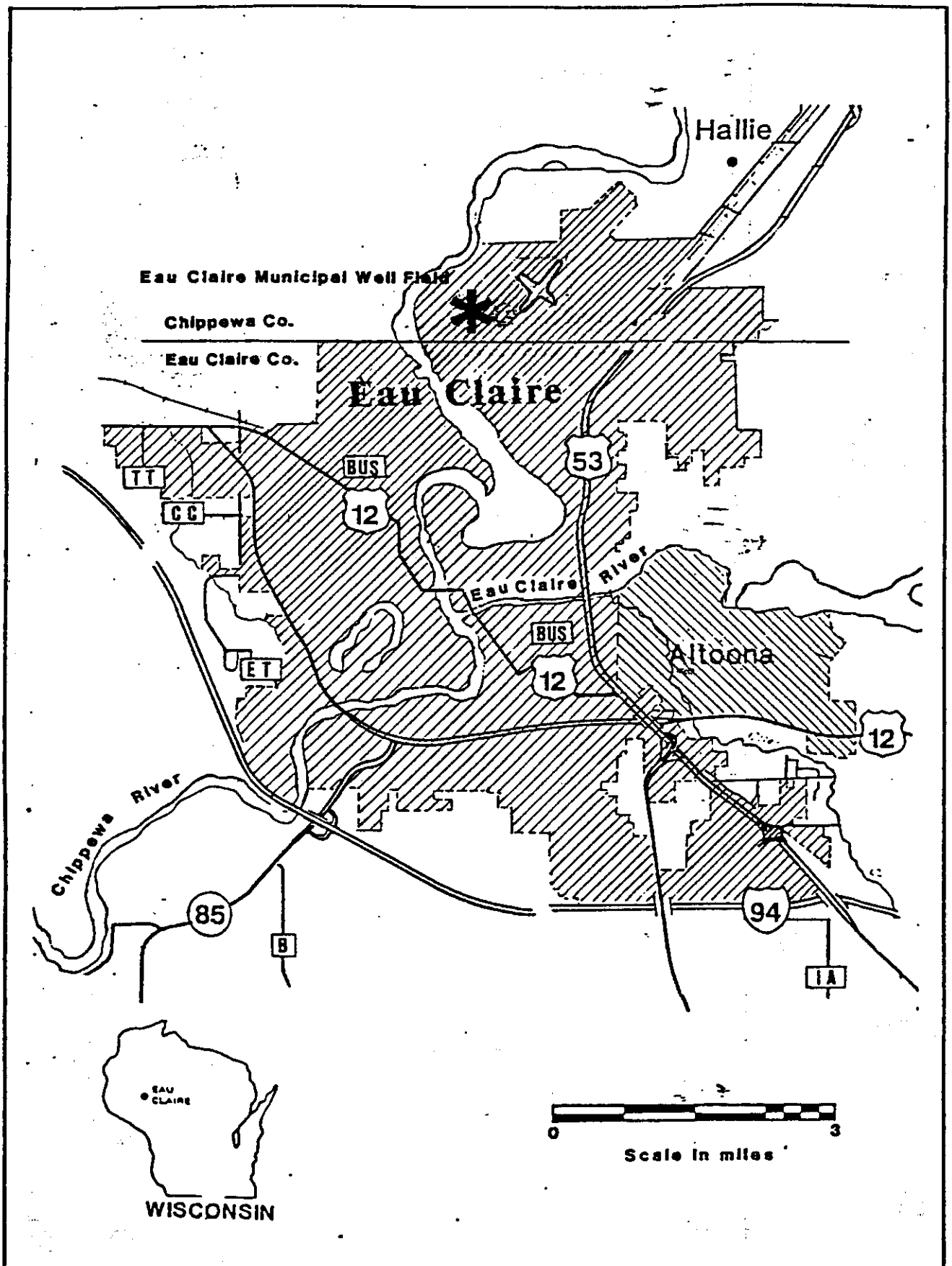
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FIGURE 1

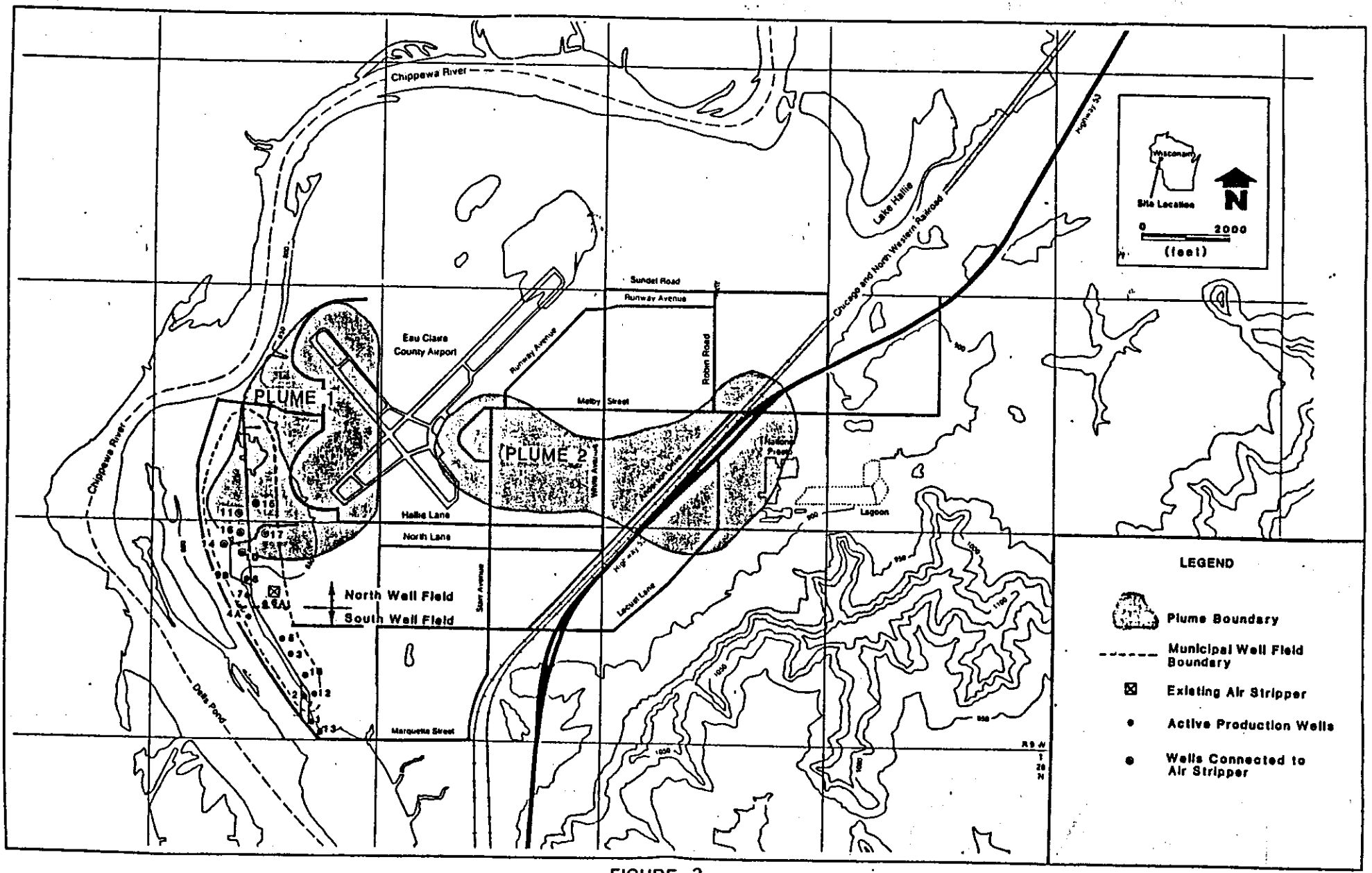

FIGURE 2

EAU CLAIRE MUNICIPAL WELL FIELD

Concerned about the future use of the water supply, the City retained E.A. Hickok and Associates in May, 1982 to conduct a hydrogeological study of the well field to identify the quantity and quality of water expected for the next 20 years. In September 1982, the City requested that Hickok and Associates conduct additional hydrogeological testing to identify the source and extent of VOC contamination in the well field. In addition, Strand Associates, Inc. was retained to evaluate various treatment alternatives for the removal of VOCs and options to improve iron and manganese removal. Concurrently, the City also upgraded laboratory equipment to provide capabilities for VOC analyses for monitoring of municipal and residential wells.

With the new laboratory equipment, the City began testing private residential wells, in addition to monitoring the municipal production wells. Residential wells located on the north side of Eau Claire and in the Town of Hallie, located immediately northeast of Eau Claire, were sampled to gather background information to assist in defining the extent and identifying potential sources of the VOC contamination. Several residential wells reported detectable levels of VOCs. Figure 3 shows the area served by the Eau Claire water distribution system and residences that do not appear to be connected to the city water system.

As a result of the residential well sampling, the City informed Mr. Donald Hillman that samples collected from his well on January 12, 1983, indicated a 1,1-dichloroethene concentration in excess of the WDNR health advisory level. The City advised Mr. Hillman not to use his water supply for drinking. Mr. Hillman's well is approximately one mile upgradient of the municipal well field in the path of contaminated groundwater flow.

By spring of 1983, the WDNR had nominated the municipal well field as a potential Superfund site. In September 1984, the Eau Claire Municipal Well Field site was proposed for listing on the Superfund National Priorities List (NPL). The site was listed as final on the NPL in September 1985. The Eau Claire site was given a high priority by the WDNR because it affects a large population and because the contaminants have a high toxicity and persist in the groundwater.

In May 1984, Strand Associates submitted their report on water treatability for the City of Eau Claire and recommended a packed tower aeration system for VOC removal. A pilot air stripping column was constructed in the Summer of 1984 to study the effectiveness of a packed tower. The preliminary test results indicated that this pilot system successfully removed VOCs from the water supply.

In addition to monitoring the private residential and municipal production wells, the WDNR began to investigate the potential sources of groundwater contamination in Eau Claire. In the Summer of 1984, WDNR representatives investigated VOC handling by 22 commercial establishments through inspecting the facilities and interviewing the owners. Of these, the WDNR identified nine that it determined were potential sources of contamination based on operational information developed through the investigation.

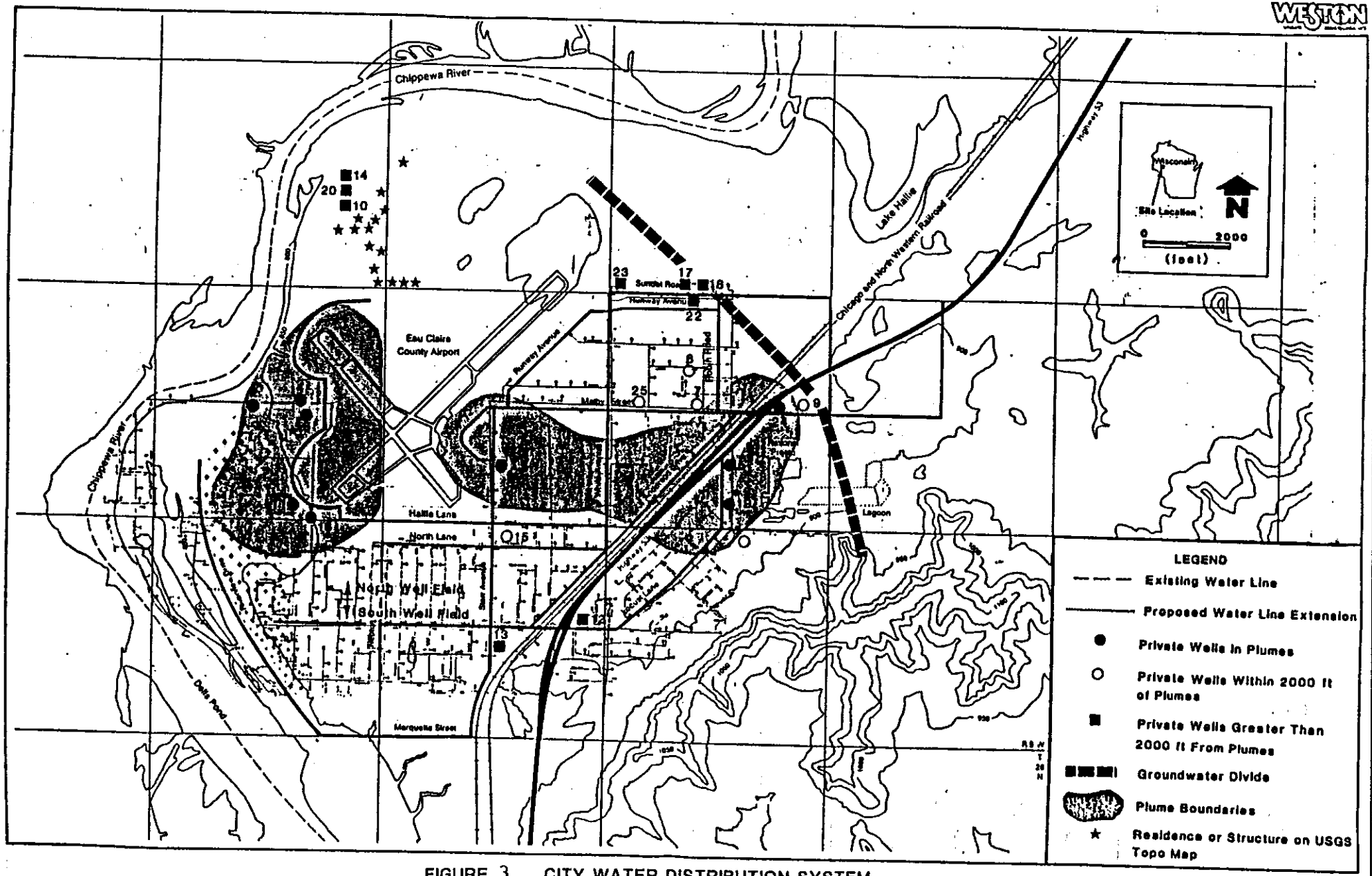

FIGURE 3 CITY WATER DISTRIBUTION SYSTEM
EAU CLAIRE MUNICIPAL WELL FIELD

CERCLA related enforcement activities began at the site in 1984. A Responsible Party Search was conducted to identify potential sources of the groundwater contamination. Nine parties were identified as either having current or past VOC disposal practices which may have contributed to groundwater contamination. In June 1985, Request for Information letters from the U.S. EPA were sent to the parties. No potentially responsible parties (PRP) were identified. However, as a result of the RI/FS, one PRP is being sent a notice letter (see Attachment A).

On October 24, 1984, a CERCLA Trust Fund allocation was made to the site and a Remedial Investigation/Feasibility Study (RI/FS) was initiated. A preliminary hydrogeologic evaluation was completed in April 1985, to summarize available geologic and hydrogeologic data in order to identify information gaps and to provide a basis to focus work efforts during the RI. The evaluation developed a general bedrock topography map using drilling logs, reinterpreted seismic refraction data, and utility excavations. The preliminary report also stated that groundwater contamination up to the time the report was issued had generally been confined to monitoring wells screened in the outwash aquifer that was located within the bedrock channel.

In April 1985, a Focused Feasibility Study (FFS) was conducted to evaluate a limited number of Initial Remedial Measures (IRMs) and to identify a cost-effective IRM for implementation. The primary objective of the IRM was to protect public health by providing a reliable supply of safe potable water to those consumers dependent on the Eau Claire Municipal Well Field, prior to completion of the comprehensive RI/FS.

In the June 10, 1985 Record of Decision, the U.S. EPA Region V Administrator determined that construction of an air stripper was a cost-effective initial remedial measure that would provide adequate protection of public health, welfare, and the environment until the completion of the RI/FS and selection of a final clean-up remedy.

Design of the air stripper was completed in February 1986. Construction of the air stripper was initiated in July 1986 under the management of the U.S. Army Corps of Engineers (USACOE), St. Paul, Minnesota district. Air stripper construction was completed in June 1987 and it was placed on-line in August 1987.

Concurrent with the air stripper design and construction, U.S. EPA continued RI/FS activities.

III. COMMUNITY RELATIONS

The Superfund activities at the ECMWF site have been followed closely and consistently by the local press. However, historically there has been very little public interest from the community.

As required by Section 113 (k)(2)(i-v) of CERCLA as amended by SARA, a public comment period for the RI/FS and Proposed Plan began on March 5, 1988. Copies of the RI report, the FS report, and Proposed Plan were made

available to the community on this date. Two locations served as repositories for these reports, with the administrative record being located in the L.E. Phillips Memorial Library repository in Eau Claire. U.S. EPA issued a press release containing the Proposed Plan prior to commencing the comment period.

The public comment period ended on March 25, 1988. Public comments are in the attached responsiveness summary.

IV. SCOPE OF RESPONSE ACTION

This remedy represents the final remedial action for the ECMWF site. In January 1985, the RI was initiated to define the nature and extent of contamination and to characterize the potential threats to public health and the environment. RI field activities were performed in three phases, beginning in November 1985 and ending in October 1987. The results of the RI are discussed below.

V. SITE CHARACTERISTICS

Groundwater

To define the nature and extent of groundwater contamination at the ECMWF site, monitoring wells were installed in the water table outwash aquifer, with the exception of two wells that were installed in the sandstone formation.

Groundwater samples collected during the RI indicate the presence of low levels of volatile organic compounds in the water table aquifer. These samples also indicate the existence of two separate plumes of VOCs.

One plume (Plume 1) is located west of the airport and extends into the municipal well field, while the other plume (Plume 2) is located east of the airport and extends to National Presto Industries (Figure 4). Currently there are five wells in the municipal well field contaminated with VOCs. Summaries of the volatile organic compounds found in Plume 1 and Plume 2 are in Tables 1-A, 1-B, and 1-C.

From the samples collected during the RI, the VOCs detected most frequently and with the highest concentration in both plumes are:

Contaminant	Concentration Range (ug/L)
1,1,1-Trichloroethane	0.03-155
Trichloroethene	0.02-13
1,1-Dichloroethane	0.01-5
1,1-Dichloroethene	0.01-4
Tetrachloroethene	0.02-3
Chloroform	0.03-1.75

The extent of the two contaminant plumes is shown in Figure 4. Plume 1 has an area of about 1.5×10^7 square feet. The saturated thickness of the

Table 1-A
Summary of Groundwater SAS Volatile Organics Data
Eau Claire MWF

PARAMETER	Phase 1		Phase 2		Total	
	Frequency	Range(max)	Frequency	Range(max)	Frequency	Range(max)
Trans-1,2-dichloroethene	2/44	0.02-0.27	0/47	------	2/91	0.02-0.27
1,1-dichloroethane	16/44	0.04-9.6	25/47	0.01-5.0	41/91	0.01-9.6
Cis-1,2-dichloroethene	7/44	0.03-0.26	16/47	0.02-2.1	23/91	0.02-2.1
1,1-dichloroethene	17/44	0.02-5.3	20/47	0.01-3.7	37/91	0.01-5.3
1,1,1-trichloroethane	30/44	0.06-82.0	38/47	0.03-155.0	68/91	0.03-155.0
Trichloroethene	37/44	0.02-26.0	34/47	0.02-13.0	71/91	0.02-26.0
1,1,2-trichloroethane	2/44	0.1-0.12	1/47	0.14	3/91	0.1-0.14
Tetrachloroethene	34/44	0.03-1.2	26/47	0.02-3.1	60/91	0.02-3.1
Chloroethane	0/44	------	1/47	0.43	1/91	0.43
Chloroform	3/44	0.2-0.99	8/47	0.03-1.75	11/91	0.03-1.75
1,2-dichloroethane	2/44	0.1	1/47	0.05	3/91	0.05-0.1
Bromodichloromethane	0/44	------	3/47	0.18-0.48	3/91	0.18-0.48
1,2-dichloropropane	0/44	------	1/47	2.0	1/91	2.0
Dibromochloromethane	0/44	------	1/47	0.07	1/91	0.07
Chlorobenzene	15/44	0.3-1.0	0/47	------	15/91	0.3-1.0
1,4-dichlorobenzene	NS	NS	3/47	0.09-0.16	3/47	0.09-0.16
Trichlorofluoromethane	NS	NS	3/47	0.17-1.2	3/47	0.17-1.2
Any of the above detected	42/44	------	42/47	------	84/91	------

NS - Not Sampled
All concentrations are reported in ug/l.

Frequency show the number of detections over the number of samples analyzed.
Range shows the range of maximum values at each location.

Table 1-B

Summary of Plume 1 Groundwater Data
Eau Claire Municipal Well Field Site

PARAMETER	Phase 1			Phase 2			Total		
	Frequency	Range(avg)	Geometric Mean(avg.)	Frequency	Range(avg)	Geometric Mean(avg.)	Frequency	Range(avg)	Geometric Mean(avg.)
Trans-1,2-dichloroethene	2/10	0.02-0.18	0.01	0/10	------	------	2/20	0.02-0.18	0.01
1,1-dichloroethane	9/10	0.04-8.0	0.55	6/10	0.05-3.6	0.24	15/20	0.04-8.0	0.36
Cis-1,2-dichloroethene	5/10	0.07-0.17	0.04	5/10	0.07-0.29	0.05	10/20	0.07-0.29	0.04
1,1-dichloroethene	8/10	0.03-4.3	0.28	5/10	0.29-1.2	0.09	13/20	0.03-4.3	0.16
1,1,1-trichloroethane	8/10	0.12-64.8	2.0	10/10	0.04-26.3	1.4	18/20	0.04-64.8	1.7
Trichloroethene	10/10	0.10-21.0	1.6	10/10	0.03-13.0	0.69	20/20	0.03-21.0	1.1
1,1,2-trichloroethane	2/10	0.07-0.12	0.06	0/10	------	------	2/20	0.07-0.12	0.05
Tetrachloroethene	8/10	0.04-0.86	0.11	5/10	0.13-0.46	0.11	13/20	0.04-0.86	0.11
Chloroethane	0/10	------	------	1/10	0.32	0.27	1/20	0.32	0.12
Chloroform	1/10	0.67	0.04	0/10	------	------	1/20	0.67	0.03
1,2-dichloroethane	0/10	------	------	0/10	------	------	0/20	------	------
Bromodichloromethane	0/10	------	------	0/10	------	------	0/20	------	------
1,2-dichloropropane	0/10	------	------	0/10	------	------	0/20	------	------
Dibromochloromethane	0/10	------	------	0/10	------	------	0/20	------	------
Chlorobenzene	4/10	0.39-0.74	0.26	0/10	------	------	4/20	0.39-0.74	0.18
1,4-dichlorobenzene	NS	NS	NS	1/10	0.08	0.11	1/10	0.08	0.11
Trichlorofluoromethane	NS	NS	NS	0/10	------	------	0/10	------	------

NS - Not Sampled
All concentrations are reported in ug/l.

NOTE: Ranges and geometric means were derived by using the average value from the maximum/arithmetic mean tables.

Table I-C

Summary of Plume 2 Groundwater Data
Eau Claire Municipal Well Field Site

PARAMETER	Phase 1			Phase 2			Total		
	Frequency	Range(avg)	Geometric Mean(avg.)	Frequency	Range(avg)	Geometric Mean(avg.)	Frequency	Range(avg)	Geometric Mean(avg.)
Trans-1,2-dichloroethene	0/7	------	------	0/22	------	------	0/29	------	------
1,1-dichloroethane	3/7	0.06-0.68	0.06	17/22	0.01-4.3	0.35	20/29	0.01-4.3	0.23
Cis-1,2-dichloroethene	1/7	0.06	0.01	11/22	0.02-2.1	0.03	12/29	0.02-2.1	0.03
1,1-dichloroethene	4/7	0.02-0.09	0.02	15/22	0.01-3.0	0.08	19/29	0.01-3.0	0.06
1,1,1-trichloroethane	6/7	0.12-1.9	0.39	20/22	0.03-128.0	1.4	26/29	0.03-128.0	1.0
Trichloroethene	7/7	0.03-4.8	0.63	19/22	0.12-9.6	0.9	26/29	0.03-9.6	0.83
1,1,2-trichloroethane	0/7	------	------	1/22	0.14	0.05	1/29	0.14	0.05
Tetrachloroethene	6/7	0.04-0.12	0.06	17/22	0.02-3.1	0.09	23/29	0.02-3.1	0.08
Chloroethane	0/7	------	------	0/22	------	------	0/29	------	------
Chloroform	2/7	0.08-0.16	0.1	5/22	0.02-1.75	0.05	7/29	0.02-1.75	0.06
1,2-dichloroethane	0/7	------	------	1/22	0.05	0.02	1/29	0.05	0.02
Bromodichloromethane	0/7	------	------	3/22	0.18-0.48	0.06	3/29	0.18-0.48	0.06
1,2-dichloropropane	0/7	------	------	0/22	------	------	0/29	------	------
Dibromochloromethane	0/7	------	------	1/22	0.07	0.05	1/29	0.07	0.06
Chlorobenzene	3/7	0.4-0.74	0.26	0/22	------	------	3/29	0.4-0.74	0.15
1,4-dichlorobenzene	NS	NS	NS	1/22	0.14	0.12	1/22	0.14	0.12
Trichlorofluoromethane	NS	NS	NS	2/22	0.9-1.2	0.07	2/22	0.9-1.2	0.07

NS - Not Sampled
All concentrations are reported in ug/l.

NOTE: Ranges and geometric means were derived by using the average value from the maximum/arithmetic mean tables.

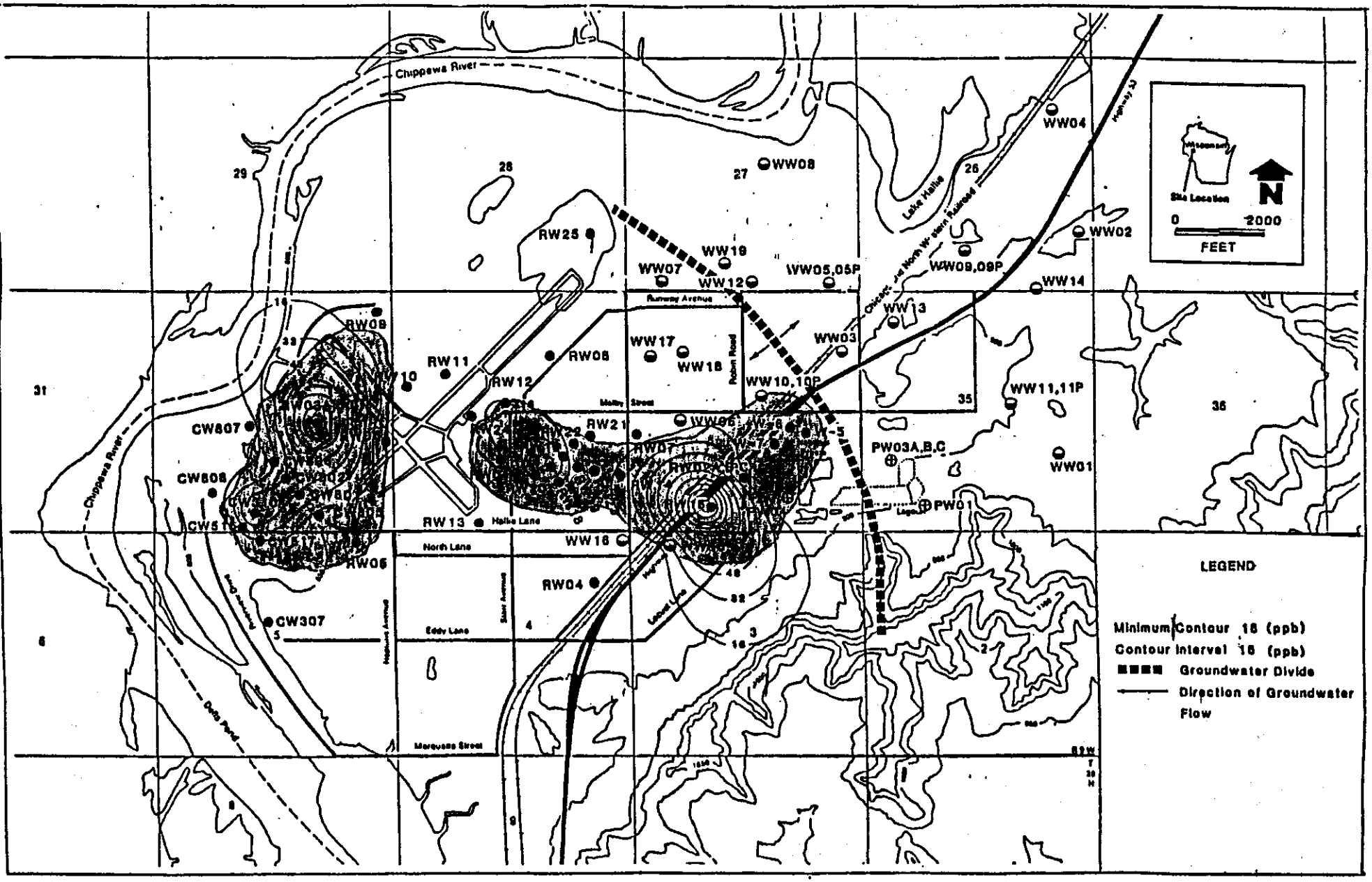

FIGURE 4 DEFINITION of PLUMES
EAU CLAIRE MUNICIPAL WELL FIELD SITE

glacial outwash in the area of Plume 1 ranges from 35 to 80 feet. The estimated volume of contaminated groundwater in Plume 1 is 1.9×10^8 cubic feet. Plume 2 has an area of about 2.0×10^7 square feet. The saturated thickness of the glacial outwash in the area of Plume 2 also ranges from 35 to 80 feet. The estimated volume of groundwater of Plume 2 is 2.6×10^8 cubic feet.

Surface Water

To determine if contaminants are present in the surface water either as a source of well field contamination, or as a result of groundwater discharge into the Chippewa River, samples (SW01, SW02, SW03) were collected from the river upgradient, adjacent to, and downgradient from the municipal well field. The sampling locations are shown in Figure 5. A brief summary of the results is given below:

SW01 (upgradient)	-	No contaminants of concern
SW02 (adjacent)	-	1,1,1-Trichloroethane (0.045 ug/L)
		Trichloroethene (0.02 ug/L)
		Chlorobenzene (0.031 ug/L)
SW03 (downgradient)	-	Trichloroethene (0.02 ug/L)

While some low levels of VOCs were detected in the samples, evaluation of these data indicates that the surface water in the study area is substantially less contaminated than the groundwater, and therefore is not likely to be a source of the well field contamination. Furthermore, extensive pumping of the well field prevents groundwater discharge to the river, thus leading to the conclusion that the low levels of contaminants detected in the river are unrelated to those in the groundwater.

Source Investigation

A three part investigation was performed to identify possible sources of the groundwater contamination. The first part was an industrial survey consisting of on-site inspections of several industries that may use solvents. The survey focused on the Eau Claire County Airport and Chippewa Valley Industrial Park located east of the airport and west of U.S. Highway 53. The survey identified four locations warranting on-site investigation and sampling. The second part of the source investigation was a semi-quantitative soil gas survey of possible source areas at the various industrial facilities. Finally, a soil sampling program was implemented to confirm the presence or absence of residual VOCs in the surface and subsurface soil boring samples. Monitoring wells were installed in the soil borings and groundwater samples were collected.

The semi-quantitative soil gas data indicated the possibility of VOC source areas within these facilities, but there was no overwhelming or clear evidence to guide the soil sampling program. Neither the surface soil sampling nor the soil boring sampling found any evidence of residual soil contamination that could represent a source of the groundwater

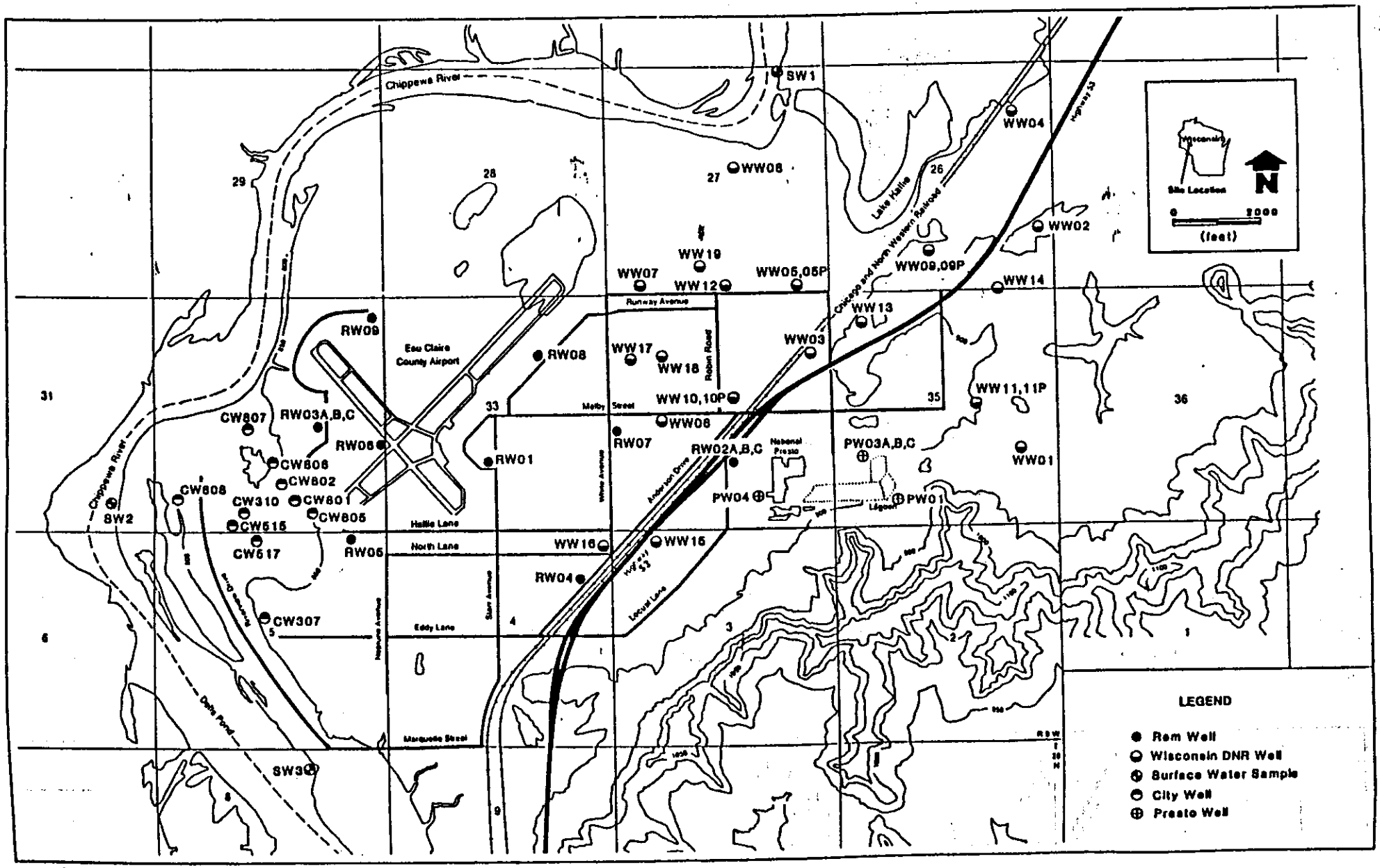

FIGURE 5 PHASE I GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS
EAU CLAIRE MUNICIPAL WELL FIELD SITE

contamination in the study area. The volatile organic compounds found to be predominant in the groundwater contamination were not found in any of the surface soil or soil boring samples, with the possible exception of chloroform. Thus, none of the possible source areas identified by the industrial survey and the soil gas survey could be confirmed to have any role in causing the groundwater contamination in the study area.

Groundwater samples from downgradient monitoring wells at the potential source areas detected some VOCs at higher concentrations than in wells immediately upgradient. However, monitoring wells further upgradient of these facilities also detected VOCs.

In light of the results from the groundwater, surface water, and source investigation performed during three phases of the RI, it was determined that further source control investigation was not justified. Hence the remediation of contamination at the ECMWF site is limited to the groundwater in the form of two plumes (Plume 1 and Plume 2).

Other Potential Sources

Another potential source of the VOCs contaminating the groundwater in the study area is National Presto Industries, Inc. (NPI). This facility, which is located east of the industrial park, is listed on the National Priorities List (NPL) as a site separate from the ECMWF site. NPI is currently undergoing its own RI/FS. Nevertheless, available information suggests that it could be a source of the groundwater contamination with which this study is concerned.

VI. SUMMARY OF RISKS

A Public Health Evaluation (PHE) was performed as part of the RI to evaluate the potential impacts to human health and the environment, assuming no further remedial action is taken at the site. As discussed earlier, an air stripper is currently on-line to remove VOCs from municipal water until the expiration of the (IRM) ROD in June 1990.

The exposure pathway of concern for human exposure includes ingestion and inhalation of the hazardous substances in the groundwater. The population affected includes those connected to the municipal water supply and private well users located in the areas of Plume 1 and Plume 2. The human exposure pathways for current and future use are identical, for if the air stripper was taken off-line, the municipal well users would be exposed to the same chemicals as private well users in Plume 1.

The individual contaminants are separated into two categories of chemical toxicity depending on whether they exhibit noncarcinogenic or carcinogenic effects. The PHE identified the contaminants of concern in Plumes 1 and 2 which are carcinogens. This was determined by the cancer potency factor which was used to estimate the lifetime excess carcinogenic risk

associated with low-dose exposure. No human health risk was found to be associated with noncarcinogens. Carcinogens of concern are:

Plume 1	Plume 2
1,1-Dichloroethene	1,1,-Dichloroethene
Tetrachloroethene	Tetrachloroethene
Trichloroethene	Trichloroethene
	Chloroform

The carcinogenic risks are theoretical quantifications, and are reported as excess lifetime cancer risks. Excess lifetime cancer risk is defined as the incremental probability of getting cancer compared to the probability if no exposure occurred. For example, a 1×10^{-6} excess lifetime cancer risk represents an exposure that could result in one extra cancer case per million people exposed. The cancer risk levels assume ingestion of two liters per day of drinking water for 70 years.

The calculated cumulative excess lifetime cancer risks resulting from exposure to chemicals of concern in the groundwater are presented below:

Lifetime Excess Cancer Risk

Multiple Pathways	Air Stripper effluent	Plume 1		Plume 2	
		Average	Plausible Maximum	Average	Plausible Maximum
Ingestion of Water	5×10^{-7}	4×10^{-6}	8×10^{-5}	2×10^{-6}	6×10^{-5}
Inhalation while showering	1×10^{-6}	6×10^{-6}	1×10^{-4}	2×10^{-6}	1×10^{-4}
Total	2×10^{-6}	1×10^{-5}	2×10^{-4}	4×10^{-6}	2×10^{-4}

The cancer risk for the air stripper effluent is conservatively high. The risk was based on using the lab detection limit of .03 ug/L for 1,1-dichloroethene because this compound was not detected in the air stripper effluent samples. Blending of the air stripper effluent with uncontaminated water from the remaining municipal wells reduces the cancer risk even further at the user's tap. The final remedy is based on the risks calculated under the plausible maximum exposure scenario.

Environmental Assessment

No pathway currently exists where environmental receptors (fish and other aquatic life) in the Chippewa River may be exposed to the groundwater contamination because groundwater discharge to the Chippewa River is prevented by the pumping from the well field. For the future scenario, if pumping were to cease and groundwater discharge resumed, based on the available toxicity data and estimated future concentrations of chemicals of concern, potential impacts to fish and other aquatic life do not appear likely.

Air Stripper Air Emissions Assessment

The risk assessment evaluated whether a public health threat exists under the current-use conditions. The exposure pathway is the inhalation of chemicals volatilized during air stripper treatment of municipal water until the expiration of the previous ROD in 1990.

The lifetime excess cancer risk for residents exposed via inhalation to the chemicals of concern released to the air during the stripping is $5x10^{-7}$. For carcinogens, EPA generally considers a risk range of 10^{-4} to 10^{-7} unit cancer risk as acceptable and generally protective of human health and the environment. Noncarcinogens were found not to pose a threat to human health.

Comparison to ARARs

The PHE also compared the concentrations in Plume 1 and Plume 2 with Federal and State Applicable or Relevant and Appropriate Requirements (ARARs). It was found that the maximum concentration of trichloroethene in both plumes exceeds both Federal and State ARARs and the maximum concentrations of 1,1-dichloroethene and tetrachloroethene in Plume 2 exceed a State ARAR (Table 2). In addition, the State regulates VOC emissions from air strippers. A discussion on the VOC emissions is presented in Section VIII, Compliance with ARARs.

VII. DESCRIPTION OF ALTERNATIVES

The Feasibility Study (FS) was initiated in January 1988 to evaluate alternative remedial actions for the groundwater contamination at the ECMWF site. Based on the results of the RI and the PHE, the following specific remedial action goals were established for a final remedy at the ECMWF site:

- To assure public health protection from the groundwater by preventing ingestion and inhalation of water with contaminant concentrations:

  1. In excess of their MCLs or Wisconsin Health Advisories.

  2. With a cumulative lifetime excess cancer risk of greater than 10^{-6}.

- Remediate the groundwater to a cumulative lifetime excess cancer risk of 10^{-6}.

A variety of technologies that would address the remedial action goals were identified, and then screened according to their applicability to the site. The remaining applicable technologies were assembled into seven remedial alternatives which were evaluated and screened against effectiveness, implementability, and cost criteria. Following screening, four alternatives remained and were analyzed in detail using the nine evaluation criteria. The alternatives for evaluation included the No Action

TABLE 2

COMPARISON OF POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE CRITERIA TO GROUNDWATER AND TAP WATER CONCENTRATIONS AT THE EAU CLAIRE SITE

(µg/liter)

Chemical	Federal Criteria		State Criteria		Concentrations				
					Plume 1		Plume 2		
	MCLG[a]	MCL[b]	WGWQS[c]	WA[d]	Geometric Mean	Maximum	Geometric Mean	Maximum	Treated Municipal Water[g]
Organic Chemicals:									
Chlorobenzene	[e]60	--	--	--	0.18	0.74	NC	NC	1.3×10^{-3}
Chloroform	--	[f]100	--	[f]100	NC	NC	0.06	1.8	NC
1,1-Dichloroethane	--	--	--	850	0.36	8.0	0.21	4.3	2.0×10^{-2}
1,1-Dichloroethene	7	7	0.24	7	0.16	4.3	0.05	3.0	$<3.0 \times 10^{-2}$
cis-1,2-Dichloroethene	[e]70	--	--	--	0.04	0.29	0.02	2.1	3.6×10^{-4}
trans-1,2-Dichloroethene	[e]70	--	--	--	0.012	0.18	NC	NC	8.0×10^{-5}
1,1,1-Trichloroethane	200	200	200	200	1.7	65	0.92	130	2.0×10^{-2}
Trichloroethene	0	5	1.8	5	1.1	21	0.71	9.6	2.0×10^{-3}
Tetrachloroethene	[e]0	--	1.0	20	0.11	0.86	0.07	3.1	3.0×10^{-2}
Inorganic Chemicals:									
Iron	--	[h]300	--	--	140	2,600	NC	NC	140
Manganese	--	[h]50	--	--	29	340	19	62	29

[a] Maximum Contaminant Level Goal (Not ARAR).
[b] Maximum Contaminant Level, except where noted.
[c] Wisconsin Public Health Groundwater Quality Standards (Wisconsin Administrative Codes, Chap. 140).
[d] Wisconsin Advisory (Wisconsin Administrative Code, Chap. 109).
[e] Proposed.
[f] Standard is for total trihalomethanes, which include bromoform, chloroform, dichlorobromomethane and chlorodibromomethane.
[g] Concentrations are the mean concentrations reported or estimted for chemicals in municpal water treated to remove organic chemicals, as reported in Table 5-7.
[h] Secondary Maximum Contaminant Level.

NC = Not a chemical of potential concern in this plume or this water.
-- This criterion or standard has not been developed for this chemical.

Alternative. An alternative that involved containment was not considered for this site because containment was not appropriate for the two plumes of groundwater contamination.

Alternative 1 - No Further Action

Capital Cost:	$0
Annual O&M Cost:	$333,100
Total Present Worth Cost:	$578,300
Time to Implement:	None

Alternative 1 is the No Action Alternative. For Plume 1, city wells 10, 11, 15, 16, and 17 located in the north well field would continue to pump contaminated groundwater to the existing air stripper. Treated groundwater from the air stripper would be pumped to the existing Eau Claire water system. This action will last until the expiration of the existing Record of Decision on June 10, 1990. Beyond this time there will be no further remedial action taken towards the groundwater. For Plume 2, no remedial action will occur. This alternative is considered a baseline scenario to which other alternatives can be compared.

Alternative 2 - Onsite Treatment, Alternate Water Supply, and Groundwater Monitoring.

Capital Cost:	$318,500
Annual O&M Cost:	$333,100
Total Present Worth Cost:	$3,699,900
Time to Implement:	40 Years

Alternative 2 provides cleanup of both plumes when they enter the north well field. City wells 10, 11, 15, 16, and 17 in the north well field would continue to pump contaminated groundwater to the existing air stripper. Treated groundwater will be pumped to the Eau Claire water system. Based on plume migration travel times, it is estimated that it would take a total of 40 years for both plumes to migrate to the well field.

The alternate water supply component of this alternative would involve connecting private well users within and near the zone of contamination to the municipal water system. Ten private wells in Plume 2 would be connected to the existing municipal supply and water mains would be constructed for five private well users in Plume 1. Bottled water would be provided for drinking until connection to the municipal water system is accomplished.

Groundwater monitoring would be conducted to determine when the target cleanup levels (TCLs) have been reached. In addition, groundwater monitoring will be conducted for 3 years after TCLs have been reached to assure the certainty of the remedy.

Alternative 3 - Onsite Treatment, Extraction, Discharge, Alternate Water Supply, and Groundwater Monitoring.

Capital Cost:	$896,500
Annual O&M Costs:	$356,400
Total Present Worth Cost:	$3,347,600
Time to Implement:	9 Years

Alternative 3 provides cleanup of Plume 1 when it enters the north well field, and provides simultaneous cleanup of Plume 2 through the use of groundwater extraction wells located in Plume 2.

For Plume 1, city wells 10, 11, 15, 16, and 17 in the north well field would continue to pump contaminated groundwater to the air stripper. Treated water would be discharged into the Eau Claire water system. This action would last until Plume 1 is cleaned up, which is estimated to take nine years based on estimated plume migration travel times.

One groundwater extraction well installed in Plume 2 would clean up the groundwater concurrent with Plume 1 in an estimated timeframe of 9 years. The extracted groundwater will be discharged into the Chippewa River without treatment.

The alternate water supply and groundwater monitoring components are the same as for Alternative 2.

Alternative 4 - Onsite Treatment, Extraction, Discharge, Alternate Water Supply, and Groundwater Monitoring.

Capital Cost:	$1,214,200
Annual O&M Costs:	$396,700
Total Present Worth Cost:	$3,030,200
Time to Implement:	5 Years

Alternative 4 is designed to remediate the groundwater contamination in both Plume 1 and Plume 2 in an accelerated timeframe of 5 years.

For Plume 1, contaminated groundwater would be pumped both by city wells 10, 11, 15, 16, and 17 in the north well field and by two groundwater extraction wells located in Plume 1. Groundwater from contaminated city wells would be treated with the air stripper and discharged into the Eau Claire municipal water system. Groundwater from the two new extraction wells in Plume 1 would be discharged into the Chippewa River without treatment. Two groundwater extraction wells would also be installed in Plume 2 to cleanup this plume concurrent with Plume 1. Extracted groundwater would be discharged to the Chippewa River without treatment.

The alternate water supply and groundwater monitoring components are the same as Alternative 2.

Factors Common to all the Alternatives:

The treated groundwater from the air stripper will provide safe drinking water to the public that does not exceed Federal or State drinking water standards. State of Wisconsin air pollution control standards for emissions from the air stripper will be followed.

Factors Common for Alternatives 3 and 4:

A Wisconsin Pollution Discharge Elimination System (WPDES) permit will be obtained for the discharge of the extracted untreated groundwater to the Chippewa River. Estimated VOC concentrations will comply with both Federal and State ARARs and WPDES discharge limits.

The number of private well users is based on current information. The actual number will be confirmed during the remedial design.

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The four alternatives assembled were evaluated based on the following nine criteria:

- Overall protection of human health and the environment;
- Compliance with all federal and state applicable, or relevant and appropriate requirements (ARARs);
- Short-term effectiveness;
- Long-term effectiveness;
- Reduction of toxicity, mobility, or volume;
- Implementability;
- Cost;
- Community Acceptance; and
- State Acceptance.

A summary of the relative performance of the alternatives with respect to each of the nine criteria is provided in this section.

Overall protection of human health and the environment

Alternatives 2, 3 and 4 would all be effective in protecting public health from ingestion and inhalation of contaminants detected in the groundwater by providing a safe, reliable, potable water supply to those residents currently connected to the Eau Claire municipal water system, as well as those using private water supply wells within the area of groundwater contamination. This is accomplished by treatment with the existing air stripper of contaminated groundwater from five municipal wells prior to blending with uncontaminated water in the distribution system and connection of private well users to the municipal water system. Environmental receptors are not affected by the groundwater contamination. Alternative 1 does not provide adequate protection of public health since this alternative will last only until the expiration of the IRM ROD on June 10, 1990. This alternative will not be considered further.

To evaluate if a public health threat is present from the VOC emissions released into the atmosphere from the air stripper a risk assessment was performed. For Alternative 2, the FS evaluated the risk associated with air emissions for the maximum anticipated influent concentrations based on maximum groundwater concentrations found in Plume 1 and Plume 2. The lifetime excess cancer risk was found to be 2×10^{-6}. The U.S. EPA Air and Radiation Division evaluated the risk for Alternatives 3 and 4 in which only contaminants in Plume 1 would be treated with the air stripper. Using the geometric mean groundwater concentrations, there is an estimated total peak cancer risk of 8.6×10^{-8}. Using the maximum groundwater concentrations results in a total peak cancer risk of 2.3×10^{-6}. Noncarcinogens were found not to present a threat to human health.

Alternatives 3 and 4 discharge untreated groundwater to the Chippewa River. The U.S. EPA Air and Radiation Division also performed a risk assessment on the volatization of VOCs from the river to the air. The total peak anticipated cancer risk for inhalation at the discharge point is 6.7×10^{-7}.

The above levels are within the 10^{-4} to 10^{-7} unit cancer risk range that EPA generally considers protective of human health and the environment. Therefore, the results of the air risk assessment indicate that the public health risk due to air emissions from the air stripper and volatilization of VOCs from the Chippewa River present a low level of risk.

Radiation problems in air emissions can originate from air stripping if concentrations of radon-222 and thoron gases are substantial in the groundwater. There has not been any testing for radon or thoron in the groundwater at the municipal well field. However, the geology of the area, and the outwash aquifer being used, are not likely to generate radon. In order to verify this, the municipal water will be sampled for radon-222 and thoron during the design phase for the remedial action.

Compliance with ARARs

Each of the 4 alternatives was assessed as to whether it complied with State and Federal Applicable or Relevant and Appropriate Requirements (ARARs). All alternatives would be required to meet the following ARARs upon implementation:

- Safe Drinking Water Act (SDWA) Maximum Concentration Limit (MCLs)
- Wisconsin administrative code chapter NR109 (governs water quality from air stripping);
- Wisconsin administrative code chapter NR140 (applies to all department regulated groundwater activities);
- Wisconsin administrative code chapters NR400-499 (regulates air emissions from air stripping);
- Wisconsin administrative code chapter NR111 (regulates well treatment and distribution design for community and municipal supplies); and
- Resource Conservation and Recovery Act (RCRA) Part 264 (regulates groundwater monitoring program).

Alternatives 3 and 4 involve components of groundwater extraction and discharge of untreated groundwater to the Chippewa River and would also be required to meet these additional ARARs:

- Clean Water Act (CWA) NPDES requirements listed in 40 CFR 122;
- CWA Ambient Water Quality Criteria for Protection of Aquatic Life;
- Wisconsin administrative code chapters NR102, 104, 200, 217, and 219 (regulates discharge to surface water, including setting effluent limits, stream classification/standards, and sampling/testing methods). The state will issue a WPDES permit;
- Wisconsin administrative code chapter NR112 (regulates any wells extracting greater than 70 gpm);
- Wisconsin administrative code chapter NR115-118 (regulates construction activity in the flood-plain); and
- Wisconsin statute chapter 30 (Permits, approvals, technical standards).

Wisconsin administrative code chapters NR400-499 regulate air emissions from the air stripper. Controls are tripped if air stripper VOC emissions exceed 3 lbs/hr or 15 lbs/day. In addition, if the air stripper emits greater than 5.7 lbs/hr the stripper is subject to a permit which makes it subject to 85 percent controls. Actual field data of the influent to the air stripper will be used to determine whether the above standards are exceeded.

The U.S. EPA Air and Radiation Division estimated total VOC emissions for the air stripper under worst and average case conditions using the available groundwater data. For Alternative 2, under average conditions, total VOC emission rates of 0.36 lbs/day may be encountered. For worst case conditions (maximum VOC groundwater concentrations) a 16.44 lbs/day (.69 lbs/hr) VOC emission rate may be encountered. For Alternatives 3 and 4 under average conditions, total VOC emission rates may be 0.36 lbs/day and under the worst case scenario (maximum VOC water concentrations), 9.79 lbs/day (.41 lbs/hr) may be encountered.

The projections of average and worst-case scenarios are very conservative and predict that controls may be needed under the worst case scenario for Alternative 2. However, whether controls are instituted will be determined from actual field testing of the influent to the air stripper. In actuality the maximum concentrations (worst case scenario) will probably not be found in the influent data from the well field.

No waivers from ARARs are anticipated at this time.

Short-term Effectiveness

Alternatives 2, 3, and 4 provide a high degree of short-term effectiveness in achieving prompt protection of human health with no significant adverse impacts from the implementation of the remedy. Immediate protection is available to residents currently connected to the municipal water system. The connection of private well users to the municipal supply is estimated

to take approximately 6 months for those requiring construction of water mains. During the interim period, these private well users will be supplied with bottled water. For Alternatives 3 and 4, the installation of extraction wells and discharge of untreated water to the Chippewa River will decrease the time until the groundwater is remediated and full protection is achieved. Implementation of these components will present no significant adverse impacts to the community or construction workers.

The implementation time to provide protection to public health will be the same for Alternatives 2, 3 and 4. The expected length of time to complete the groundwater remediation would be the following for each alternative:

Alternative 2 - 40 years
Alternative 3 - 10 years
Alternative 4 - 6 years

In Alternatives 3 and 4, an additional year is added for the design and construction of the extraction wells and discharge mechanism to the Chippewa River.

Long-term Effectiveness and Permanence

Alternatives 2, 3, and 4 will remediate the contaminated aquifer to the target cleanup level (TCL) of a total excess lifetime cancer risk of 10^{-6}. Therefore, the magnitude of residual risks associated with these alternatives will be at the 10^{-6} risk level. After the TCL has been reached, groundwater monitoring will be conducted for 3 years to assure the certainty that the remedy successfully cleaned up the groundwater. Private well users will be connected to the Eau Claire Municipal water system and groundwater monitoring for VOCs will continue after the remedial action is completed. If VOC contamination is detected after the groundwater has been remediated, the air stripper will remain at the water plant to be put back on-line.

Reduction of Toxicity, Mobility or Volume

Alternative 2 (the use of the air stripper) and Alternatives 3 and 4 (the use of the air stripper, extraction wells, and discharge to the Chippewa river) will reduce the concentration of contaminants in the aquifer and eliminate the primary exposure route of using contaminated water for potable purposes. However, there will not be a reduction of toxicity, mobility and volume of hazardous constituents beyond those occurring naturally through dilution, dispersion, adsorption, biological degradation, and ultraviolet radiation. Therefore, none of the alternatives reduce toxicity, mobility, and volume of hazardous constituents through treatment.

Implementability

The implementability of each alternative is based on technical feasibility, administrative feasibility, and the availability of services and material for the alternative. All of the alternatives are technically feasible and involve technologies which have been used regularly in the past and have a demonstrated performance record. Each alternative would use the existing air stripper, which has achieved satisfactory reductions of VOCs. Alternatives 2, 3, and 4 include a groundwater monitoring program, provide bottled water, and allow for connection to the municipal water system and the construction of water mains. Alternatives 3 and 4 involve construction of extraction wells and discharge of untreated water to the Chippewa River. The FS evaluated two methods of conveying the extracted groundwater to the river which are: 1) use of force mains and 2) the combination of using the existing storm sewer and force mains. According to the City of Eau Claire, the storm sewer will not be able to take on the additional flow and therefore will not be considered further. Whether a submerged or an aerated outfall discharge system to the Chippewa River is used will be evaluated and determined during the remedial design. The discharge system will comply with WPDES permit requirements, and the system most cost-effective and protective of human health and the environment will be implemented. The WPDES discharge permit and construction permits from the State are administratively feasible. In addition, EPA plans to obtain approvals from the City and County of Eau Claire. The services and materials required for each alternative are expected to be readily available.

Both the State and City have expressed concerns on whether the extraction wells installed in Plume 1 for Alternative 4 will cause substantial induced inflow from the Chippewa River and subsequently require additional treatment of the municipal water supply to remove iron and manganese. The remedial design will evaluate and determine extraction well locations to minimize this possibility.

A cost summary for each remedial alternative is presented below. The costs assume use of the force main discharge to the Chippewa River.

COST SUMMARY

Assembled Alternatives	Capital Cost	Annual Operation and Maintenance	Annual Monitoring	Total Present Worth
1	0	333,100	58,500	578,300
2	318,500	333,100	58,500	3,699,900
3	896,500	356,400	58,500	3,347,600
4	1,214,200	396,700	58,500	3,030,200

Community Acceptance

Community response to the alternatives is presented in the responsiveness summary.

State Acceptance

The State of Wisconsin has concurred with the selected remedy presented below.

IX. SELECTED ALTERNATIVE

Based on current information, the U.S. EPA and the WDNR select Alternative 4 as the most appropriate final remedy at the Eau Claire Municipal Well Field site. The significant features of this remedy are as follows:

° Treat contaminated municipal water with an existing air stripper;

° Provide municipal water to private well users within or near the area of groundwater contamination;

° Install groundwater extraction wells in the plumes of contamination; and,

° Discharge untreated groundwater from extraction wells to the Chippewa River.

Target Cleanup Levels

For carcinogens, U.S. EPA generally considers risk of 10^{-4} to 10^{-7} unit cancer risk as acceptable and generally protective of human health and the environment. The total additive potential risks at the site are $2x10^{-4}$ for ingestion and inhalation of groundwater from both plume 1 and plume 2. Since the total additive potential risks from the site are greater than 10^{-4}, the target cleanup level for the remedial action will be health driven, and protection will be provided to the additive 10^{-6} risk level at the potential receptor.

Listed below are the TCL's that need to be reached for each contaminant to achieve the additive 10^{-6} risk level. These concentrations are based on current groundwater data. However, during the remedial action, the TCL for each constituent may change in order to reach the additive 10^{-6} risk level.

				Requirements		
			**	Federal	Wisconsin	
Plume 1	Max. Conc.	TCL	Target Risk	MCLs	WGWQC	WA
Trichloroethene	21.0	0.5	3.4×10^{-7}	5	1.8	5
1,1-Dichloro-ethene	0.9	0.1	2.5×10^{-7}	7	.24	7
Tetrachloroethene	4.3	0.01	4.6×10^{-7}	-	1	20
			1×10^{-6}			

Plume 2	Max. Conc.	TCL	** Target Risk	Requirements: Federal MCLs	Wisconsin WGWQC	Wisconsin WA
Trichloroethene	9.6	0.4	2.6×10^{-7}	5	1.8	5
Chloroform	1.8	0.06	2.4×10^{-7}	100*	--	100*
1,1,-Dichloro-ethene	3.0	0.007	3.6×10^{-7}	7	.24	7
Tetrachloroethene	3.1	0.09	2.0×10^{-7} / 1×10^{-6}	-	1	20

Concentrations in ug/L
Maximum Contaminant Level, (MCL)
Wisconsin Public Health Groundwater Quality Standards (WGWQC)
Wisconsin Advisory (WA).
*Standard is for total trihalomethanes.
--A standard has not been developed for this chemical.
**Target risk includes both ingestion and inhalation risk.

The detection limits for the Special Analytical Services - low detection limit analysis are higher than the TCLs for tetrachloroethene in Plume 1 and chloroform and 1,1-dichloroethene in Plume 2. Therefore, EPA will cleanup the groundwater to non-detect for these compounds and continue to pump and treat for a period of time beyond the non-detect to assure that the TCLs have been reached.

Remedial Action and
Operations and Maintenance

The U.S. EPA will pay 90 percent of the construction costs and the State of Wisconsin will pay 10 percent. According to Section 104 of the Superfund Amendments and Reauthorization Act (SARA), treatment or other measures to restore groundwater to target cleanup levels are considered remedial action of a period of up to 10 years. Therefore, U.S. EPA will pay 90 percent and the State will pay 10 percent of the operations and maintenance (O&M) cost of the extraction wells and discharge to the Chippewa River until cleanup levels are reached or for up to 10 years, beyond which the State of Wisconsin will assume full responsibility.

Additionally, U.S. EPA policy currently states that the 10 year provision for Federal 90 percent funding applies to water treatment systems which are part of a remedial strategy to restore an aquifer. Therefore, O&M of the air stripper will be provided by the U.S. EPA and the State of Wisconsin/City of Eau Claire at a 90/10 percent cost share until aquifer cleanup levels are reached or for up to 10 years, which ever comes first. Beyond this the State/City of Eau Claire will assume responsibility. However, with Alternative 4 remedial action is not anticipated to go beyond this time frame.

In the previous ROD for the IRM, the City of Eau Claire provided the 10 percent match for the first year and then assumed all O&M for the 5 year

life of the project. This no longer applies since the air stripper is part of the final remedial strategy to restore the aquifer.

Groundwater monitoring for 3 consecutive years after the completion of the remedial action will be considered O&M, for which the State will assume responsibility.

X. Statutory Determinations

A. Protection of Human Health and the Environment

The selected remedy provides protection of human health by providing a safe reliable water supply to those residents currently connected to the Eau Claire municipal water system, as well as those using private wells within the area of groundwater contamination. This is accomplished by treatment with the existing air stripper of groundwater from contaminated municipal wells prior to discharge into the distribution system and connection of private well users to the municipal water system. The prevention of ingestion and inhalation of water with contaminant concentrations that are in excess of MCLs and State health advisories and with a total lifetime excess cancer risk for all contaminants of 10^{-6} will be accomplished. In addition, the groundwater will be restored in an estimated time frame of 5 years.

B. Attainment of Applicable or Relevant and Appropriate Requirements

Alternative 4 will meet the following Federal and State applicable or relevant and appropriate requirements (ARARs):

1. Resource Conservation and Recovery Act (RCRA): 40 CFR Part 264
2. Clean Water Act (CWA): 40 CFR Parts 122, 125
3. Safe Drinking Water Act (SDWA): 40 CFR Parts 141-146
4. State of Wisconsin administrative code: chapters NR 102, 104, 109, 111, 112, 115, 118, 200, 217, 219, and 400-499.
5. Wisconsin Statute Chapter 30.

The Clean Air Act is not an ARAR, since there are no substances in the Eau Claire groundwater plumes specifically regulated by U.S. EPA air statutes. The Administrative Code chapters 400-499, air pollution control standards, are applicable, because they regulate emissions from treatment systems.

1. Resource Conservation and Recovery Act (RCRA)

40 CFR Part 264.100 requires a corrective action monitoring program. Since the Eau Claire Municipal Well Field is not regulated under RCRA, RCRA regulations are not applicable, but rather are relevant and appropriate. The monitoring system will verify that contaminants have been removed by the extraction wells. Monitoring may be discontinued if groundwater standards are not exceeded for 3 consecutive years.

2. Clean Water Act (CWA)

The CWA is an ARAR since site groundwater will be discharged to a surface water body (the Chippewa River) next to the site. Ambient Water Quality Criteria (AWQC) are established for the protection of freshwater aquatic organisms. AWQC will be met at the discharge point, and a WPDES permit will be obtained for this discharge.

3. Safe Drinking Water Act (SDWA)

The SDWA specifies MCLs for drinking water contaminants at public water supplies. The SDWA is applicable since regulated synthetic organic chemicals exceed MCLs in the community drinking water supply aquifer (in Plumes 1 and 2). Target cleanup levels will be below individual MCLs, to ensure that the cumulative risk is within the risk range.

4. Wisconsin Administrative Code and State Statutes

The following Wisconsin administrative code (WAC) and Statute regulate the preferred remedial activity to be performed at ECMWF:

a. WAC chapters NR 400-499 - are air pollution control standards which regulate emissions from treatment systems (in this case the air stripper).

b. WAC chapters NR 109 - is a drinking water standard governing the quality of water from air stripping towers.

c. WAC chapter NR 140- Wisconsin Public Health Groundwater Quality standards. Applies to all department regulated activities; standards include groundwater monitoring and sampling frequency.

d. WAC chapters NR 102, 104, 200, 217, and 219 - are regulations covering discharge of wastewater to surface waters (Chippewa River). These statutes set effluent limits, provide for discharge permits, and give water sampling and testing methods. The state will issue a WPDES permit, providing, as expected, all requirements are met.

e. WAC chapter NR 111 - is a regulation covering extraction well treatment center and distribution system design and construction standards for community and municipal water supplies.

f. WAC chapter NR 112 - is a standard governing any individual or combination of water wells which withdraw 70 gpm or more. Concerns include drawdown impacts and the prohibition of injection wells of any kind.

g. WAC chapter NR 115-118 - are regulations covering construction activities in river flood plain areas. Generally, such construction must be evaluated for any impact on upstream flooding and no activity is allowed in the "floodway" including hazardous

waste disposal. These statutes cover activities in both incorporated or unincorporated floodplain areas.

h. Wisconsin Statute chapter 30-Permits, approvals and technical standards for construction of outfall in the Chippewa River.

As mandated, where State ARARs are more stringent than Federal ARARs, the State requirements will be met at the completion of the remedial action.

C. Cost-effectiveness

The selected remedy affords a high degree of overall effectiveness not only in protecting human health by preventing consumption of contaminated groundwater, but also in providing the greatest degree of short term effectiveness by remediating the groundwater in the shortest time frame. In addition, the selected remedy is the least costly of the alternatives evaluated and therefore the most cost-effective.

D. Utilization of Permanent Solution and Alternative Treatment Technologies or Resources Recovery Technologies to the Maximum Extent Practicable.

U.S. EPA and WDNR believe this remedy is the most appropriate solution for meeting the goals of the final remedy at the Eau Claire Municipal Well Field site. All of the alternatives evaluated in the detailed analysis with the exception of the No Action alternative provide adequate protection of public health and the environment. Alternatives 2 through 4 are comparable with respect to long term effectiveness, reduction of toxicity, mobility and volume, and implementability. However, alternative 4 provides the greatest short term effectiveness and is the most cost effective.

Extraction of the contaminated groundwater will permanently restore the aquifer and air stripping is the most appropriate type of treatment. Therefore, the selected remedy provides the best balance among the nine criteria and represents the maximum extent to which permanent solutions and treatment are practicable.

E. Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment which permanently and significantly reduces the toxicity, mobility or volume of hazardous substances as a principal element is not satisfied.

Treatment with the use of the air stripper to provide safe drinking water to the municipal water system is currently in operation. Treatment of extracted groundwater for discharge to the Chippewa River is not needed because of low levels of contaminants. Therefore, treatment of the principal threat of the site, the contaminated groundwater, which permanently and significantly reduces the toxicity, mobility, or volume of hazardous substances was found not to be practicable and cost-effective.

SCHEDULE

The following are the key milestones for implementation of the remedial action:

Approve Remedial Action (exclude ROD)	March 1988
Initiate Remedial Design	June 1988
Complete Remedial Design	June 1989
Initiate Remedial Action (Award Contract)	September 1989

Water main construction and connection of private well users may be expedited by contracting the design and construction to the City of Eau Claire's municipal construction contractor.

Attachment A

Enforcement Analysis

No potentially responsible parties (PRPs) had been identified prior to the completion of the ECMWF RI/FS because the source of the ECMWF contamination was unknown. A source investigation was conducted during the RI. However, the source investigation could not confirm a source or sources and reduced the probability that the facilities investigated were the source(s). A potential source that was not investigated is the National Presto Industries (NPI). The NPI site is currently on the National Priorities List. NPI entered into an Administrative Consent Order to perform a RI/FS at their site, which is currently underway.

NPI has owned and operated the NPI site since 1948. Prior to that time the site was owned by the United States Department of Defense and was operated by the United States Army as a munitions manufacturing facility.

Based on the information provided in the RI/FS, it appears that past and present owners and operators of the NPI site are PRPs for the ECMWF site contamination. It is expected that the NPI RI/FS will provide information that will confirm or dispute this conclusion. However, to delay PRP identification until the NPI RI/FS is complete will deny PRPs the opportunity to participate in the design of the ECMWF site remedial action and inhibit their opportunity to participate in remedial action implementation. Therefore, it is expected that these PRPs will be issued a special notice letter in the near future in order to provide them with the opportunity to perform the remedy.

EAU CLAIRE MUNICIPAL WELL FIELD SITE
EAU CLAIRE, WISCONSIN

RESPONSIVENESS SUMMARY

The United States Environmental Protection Agency (U.S. EPA) recently held a public comment period, March 5, 1988, to March 25, 1988, for interested parties to comment on the U.S. EPA's March 4, 1988, Feasibility Study (FS) and Proposed Plan for the final remedy at the Eau Claire Municipal Well Field (ECMWF) site.

The purpose of this responsiveness summary is to document U.S. EPA's responses to comments received during the public comment period. All of the comments summarized in this document were considered by the U.S. EPA in making its final decision concerning remedial action at the ECMWF site. Included in this responsiveness summary, as Attachment A, is a summary of the community relations activities conducted by U.S. EPA with respect to the site.

I. RESPONSIVENESS SUMMARY OVERVIEW

Recommended Alternative

The feasibility study identified and evaluated alternative remedial actions for the groundwater contamination at the Eau Claire Municipal Well Field site. Four alternatives were screened and evaluated based on the nine criteria detailed in the Decision Summary. U.S. EPA's recommendation was Alternative 4 - Onsite Treatment, Discharge, Alternate Water Supply, and Groundwater Monitoring.

The final groundwater remedy for the site was developed to protect public health and the environment by preventing ingestion and inhalation of contaminants found in the groundwater, and by restoring the contaminated aquifer.

The major components of the selected remedy are as follows:

- Treat contaminated municipal water with an existing air stripper;
- Provide municipal water to private well users within or near the area of groundwater contamination;
- Install groundwater extraction wells in the two plumes of contamination; and,
- Discharge untreated groundwater from extraction wells to the Chippewa River.

II. SUMMARY OF COMMENTS ON THE FINAL REMEDY

The following section summarizes written comments received from interested parties. Many of the comments were edited for clarity or when multiple parties made a similar comment.

1. Comments regarding groundwater extraction.

Comment:

The City of Eau Claire is concerned with whether the extraction wells located in Plume 1 will affect the quantity and quality of water in the municipal wells by lowering the aquifer and by increasing manganese levels in the municipal wells, because of the possibility that the aquifer will be further recharged from the river's direction.

U.S. EPA Response:

Two extraction wells are estimated to be pumping at a design discharge rate of 0.5 million gallons per day (MGD). This extraction rate is relatively small, compared to the combined extraction rate of the City production wells in the north well field. Minimal additional impact is anticipated due to groundwater drawdown from the extraction wells.

Calculations show that drawdown at a distance of 1000 feet (the approximate distance between the location of the proposed extraction wells and pumping wells 15 and 17) should be less than 5 feet for every 500,000 gallons/day pumped by the extraction wells. The extraction wells will alter the pattern of groundwater flow to the municipal well field; and, thus, the amount of recharge to the well field from various directions will be changed. In particular, there will be more recharge induced from the Chippewa River. If the source of elevated manganese is the river, and if the extraction wells operate long enough, the well field could experience increased levels of manganese. The shorter the duration of extraction well operation, the less likely that increased manganese levels will actually be experienced by the municipal well field.

The remedial design will evaluate the extraction well system in detail. The exact locations of the extraction wells will be determined to minimize the possibility of substantial induced inflow of water from the direction of the Chippewa River, which may increase the level of manganese in the municipal wells. In addition, the design will evaluate whether additional treatment at the water plant for manganese may be needed and at what concentrations. However, it may not be known until the actual implementation of the remedial action if additional treatment is necessary. If so, U.S. EPA will address this concern.

Comment:

The City of Eau Claire is concerned whether the selected alternative will be successful in Plume 1. They have been pumping 4 to 8 MGD from Plume 1 since 1981, and VOC levels have not changed. The City is also concerned as to what the 5 year cleanup time is based on.

U.S. EPA Response:

Based on calculations of groundwater flow velocities, the estimated plume migration travel time for the entirety of Plume 1 to reach the north well field is nine years. U.S. EPA proposes to install two groundwater extraction wells located in the north well field to add to the existing five City wells capacity to extract contaminated groundwater.

The 5 year cleanup time is based on the calculated travel times for groundwater flow in the study area and the locations of the extraction wells with respect to the distribution of contamination. The municipal well field has a very broad area of influence - its capture zone includes recharge induced from the Chippewa River. Thus, only a relatively small fraction of the pumpage by the municipal well field serves to extract the plume. The extraction wells have been located and will operate at pumping rates designed to maximize their effectiveness for extraction of the contaminants. The capture zones of the extraction wells correspond to the extent of the plumes and nearly all of their pumping will serve to extract the plumes.

Comment:

The Sierra Club stated that proposed extraction wells have high capacities of 500 MGD and was concerned whether the four extraction wells located in Plumes 1 and 2, operating simultaneously, would leave sufficient water for the City's needs. In addition, there is a concern whether extraction of this volume would weaken the overburden.

U.S. EPA Response:

U.S. EPA would like to clarify that it is estimated that 0.5 MGD would be extracted from each of the four extraction wells. The outwash aquifer is a very productive aquifer and it is not anticipated that the volume of water extracted will impact the volume of water available to the City or affect the overburden.

2. Comments regarding an unknown source and 5 year cleanup timeframe.

Comments: (Sierra Club, City of Eau Claire, Eder Associates Consulting Engineers, P.C., and a local citizen)

° The source or sources of the volatile organic compounds (VOCs) has not been confirmed or identified.

° The approximate amount of pollutants is unknown.

° How can the length of time needed to remove unknown amounts of VOCs be predicted when the source(s) of pollutants may be actively contributing to the groundwater pollution?

° Will the limited timeframe of 5 years provide a permanent solution?

° It would seem to be essential to incorporate cleanup of the source(s) into the proposed remedial action plan.

° The results of the National Presto Industries site are still pending, and the commentor recommends that the results of that study be incorporated into the well field remedial action plan, if appropriate.

U.S. EPA Response:

U.S. EPA has identified and characterized two plumes of contamination at the ECMWF site, each of which was fully characterized and defined during the RI. The RI, however, was unable to identify and confirm a continuous contributing source(s) that would adversely affect the cleanup of the groundwater contamination. The 5 year timeframe is based on the pumping rate of the extraction wells and plume migration travel times which are estimated from calculations of groundwater flow velocities. Assuming there is no continuous source, the estimated 5 year timeframe should permanently clean up the groundwater. However, the remedial action will not be completed until the target cleanup levels are achieved.

National Presto Industries, Inc. (NPI) has been identified as a potential source. NPI is conducting a RI/FS independent of the ECMWF site investigation, which will confirm or deny if their site is a continuous contributing source. If the NPI site is identified as a contributing source to the groundwater contamination it will be addressed in an independent remedial action and this potential source will be eliminated.

3. General Comments:

Comment:

A local citizen is concerned about discharging the untreated extracted groundwater to the Chippewa River.

U.S. EPA Response:

The U.S. EPA respects this concern and would like to point out that a Wisconsin Pollution Discharge Elimination System (WPDES) permit will be obtained which will set limits of contaminants allowed in the discharge. This should assure that the discharged water will not pose a threat to human health and the environment. Estimated concentrations of VOCs in the Chippewa River after discharge and dilution are expected to be below Federal and State Standards.

Comment:

The Sierra Club concurs with the discharge of the untreated groundwater to the Chippewa River.

U.S. EPA Response:

U.S. EPA appreciates the Sierra Club's acceptance of this component of the remedy.

Comment:

The City of Eau Claire questioned whether it would be possible to pump the water from the north wells to the Chippewa River, running 24 hours per day at 2 MGD each and provide Eau Claire with additional wells in the south well field instead.

U.S. EPA Response:

This alternative was evaluated in the FS as Alternative 5 which assumed that both plumes would migrate to the well field and the air stripper would operate for approximately 40 years. This alternative was dropped from further consideration because the effectiveness of being able to supplement the lost water supply by drilling additional wells in the south well [redacted] is unknown. The cost of investigating and installing new production wells, including associated power costs, would probably offset the costs of continued use of the air stripper. An additional factor considered is that water from the south well field typically has higher iron and manganese concentrations that would place additional demands on the existing Eau Claire water treatment plant.

The U.S. EPA further evaluated the proposed alternative from the City against the use of the air stripper for 9 years, the estimated plume migration time for Plume 1 to reach the north well field along with the installation of extraction wells in Plume 2 in order to clean up this plume concurrent with Plume 1. It was determined that the same reasons mentioned above apply, including that the additional capital costs associated with this alternative would probably offset the costs of continued use of the air stripper, causing this alternative not to be as cost effective as the recommended alternative.

Comment:

The City of Eau Claire would like to be kept informed on the project, particularly the water main extension, so that they are located and sized to meet their needs. Areas outside City limits must be annexed before mains can be extended.

U.S. EPA Response:

The U.S. EPA respects this request and has full intention of working closely with the City during the remedial design and remedial action. We

are also aware of the need for annexation of adjacent lands, and, again, anticipate working closely with the City to bring this about.

Comment: (Eder Associates Consulting Engineers, P.C.)

The extension of water mains outside the City of Eau Claire limits requires the annexation of these areas. Individual treatment carbon units were considered in the selection of the alternative and dismissed because of "administrative and implementation difficulties." This would appear to be an arbitrary elimination of an alternative considering that the administrative problems of annexation would cause at least an equal number of difficulties.

U.S. EPA Response:

The individual treatment carbon units must be approved by the WDNR under the administrative code chapter NR112 and the WDNR did not support the use of these units for residents on private wells. In addition, the State indicated they did not want to be responsible for the operation and maintenance of the treatment units. The units must also be approved by the Wisconsin Department of Industry, Labor, and Human Relations under State plumbing codes ILHR 82-84. The long-term effectiveness criteria was also evaluated and determined to be not as certain with these units. U.S. EPA believes that connecting private well users to the municipal water supply would provide a greater degree of long-term effectiveness and protection of public health in respect to reduction of future risks, long-term reliability, potential need for replacement, prevent of future exposure to contaminants, ability to monitor effectiveness of remedy, and ability to perform operation and maintenance functions. The Eau Claire Municipal Water System will continue to monitor for VOCs after the completion of the remedial action.

Comment:

The Sierra Club questioned if the airport, as well as Gibson Aviation, were investigated as a possible source of Plume 1.

U.S. EPA Response:

Both the airport and Gibson Aviation were investigated as part of source investigative work during the RI. As stated in the RI/FS reports, these areas were not determined to be sources of Plume 1.

4. Comments on the RI/FS reports:

Comment:

The Sierra Club is concerned about the analytical results from Phase I groundwater samples collected for overnight analysis which were sent to the Zimpro Laboratory and whether confirmatory mass spectometry or infrared data were generated.

U.S. EPA Response:

Groundwater samples were sent to the Zimpro Laboratory in Rothschild, Wisconsin, for 24 hour turnaround analyses of 29 VOCs utilizing EPA Analytical Method 624, which does employ confirmatory mass spectrometry.

The following comments are from Eder Associates Consulting Engineers, P.C.

Comment:

The primary concern arising from the Eau Claire RI/FS report is the use of the computer generated depiction of a water table map presented on Figure 4-21 of the RI report. According to the text on page 4-73, this water table map was considered to be "more representative" than the water table map shown in Figure 4-22 which, according to the legend, is "based on actual field data". A comparison of the water level elevations provided in Appendix N to the water level contours on Figure 4-21 reveals a discrepancy of as much as plus 40-feet (NPI Monitoring Well 3). In fact, none of the water level elevations in the eastern portion of the groundwater basin agree with water level contour elevations.

U.S. EPA Response:

This comment appears to result from a misunderstanding of the purpose of Figures 4-21 (computer model water table map) and 4-22 (contoured field data water table map). Because the distribution of field data is not uniform across the study area, any water table map contoured from the field data cannot fully depict the shape and configuration of the water table, and cannot be used to define the extent of the groundwater basin tributary to the municipal well field. On the other hand, because the groundwater model can provide evenly distributed water elevation estimates, the model is capable of showing the influence of bedrock topography on the shape and configuration of the water table, and thus is a "more representative" guide to defining the extent of the groundwater basin tributary to the well field. The only use of Figure 4-21 is to define the extent of the groundwater basin tributary. There is no claim made that Figure 4-21 is an accurate representation of the water table elevations in the study area. For calculations dependent on actual water table elevations, such as water table gradients, groundwater flow velocities, or travel times, Figure 4-22 was used.

Comment:

The groundwater basin boundary depicted on Figure 4-21 does not agree with Figures 4-2 through 4-8 in the RI report. On Figure 4-21, the boundary passes through NPI Monitoring Wells 1 and 3, but on Figures 4-2 through 4-8, the boundary (incorrectly labeled groundwater divide in these figures' legends) is shown about 1/4 mile west of these wells.

U.S. EPA Response:

The U.S. EPA and its contractor recognize this inconsistency and appreciate the comment. Please note that the correct position of the groundwater divide/boundary is shown on Figure 4-21. The position of the groundwater divide shown in Figures 4-2 through 4-8 is in error.

Comment:

The description of the criteria for the location of Plume 2 as depicted on Figure 4-8 and elsewhere in the report is confusing. The second paragraph on page 4-18 contains the statement: "Wells consistently outside the lowest (VOC) contour are...W-5, W-6, W-7, PW04...." These wells are located in the western portion of the NPI property. However, the shaded area representing Plume 2 on Figure 4-8 encompasses Wells W-5, W-6, W-7, and PW04. This area should not be included in the shaded area criteria for plume mapping as stated on page 4-18.

U.S. EPA Response:

The values of the lowest contour lines shown in Figures 4-2 through 4-8 were arbitrarily set at 10% of the maximum concentration detected to allow visual comparison of the distribution of the various components among the figures. The extent of each plume, defined to provide for conservative evaluation of potential risk, was based on actual levels of contaminants present. The levels of contaminants present in Wells W-5, W-6, W-7, and PW04 were felt to be significant enough to include these wells in Plume 2 for the purpose of characterizing that plume for the public health evaluation.

Comment:

The RI/FS concentrated on four source areas of contamination in the airport/industrial park area. However, there appears to be little or no reference to the fact that much of the area is not served by municipal sewers. The possibility of VOC contamination of groundwater in discrete pockets caused by septic tanks and dry wells (by cleaning products, for example) may be a factor in the area. This may account for anomalous VOC occurrences described in the report as being outside the plume. This presents the possibility of coincidental occurrence of VOCs within the plume caused by septic tanks and other sources.

U.S. EPA Response:

The U.S. EPA is aware of this information and agrees that there may be multiple sources of the groundwater contamination such as septic tanks and other sources within the plumes and outside the plumes. This information was taken into consideration during the industrial survey and source investigation.

Comment:

All calculations for pumpage rates and purging times are based on the computer model which does not appear to be an accurate representation of groundwater conditions. Also, the 3 inch annual recharge rate used in the model appears to be much too low and may have been chosen as a best fit for the model.

U.S. EPA Response:

The calculations for pumping rates and travel times (on which the purging times were based) were not based on the results of the computer model used to generate Figure 4-21. These calculations were based on contoured field data presented in Figure 4-22. The computer code used to calculate capture zones for the extraction wells was entirely different than that used to generate Figure 4-21.

Comment:

The data interpretation appears to be biased by the number and location of monitoring wells. How else could the inclusion of documented areas of private well contamination be described as a background area (Figure 4-8 of the RI)?

U.S. EPA Response:

U.S. EPA believes that the selection of the number and location of monitoring wells provides a good representation of the bedrock valley in order to characterize the groundwater contamination and hydrogeology of the area. The background wells located across the divide were used to define the limit of possible flow to the well field. The public health evaluation did not discard any VOC data as a result of comparison with background and thus none of the subsequent conclusions were in any way biased by the characterization of background water quality presented in the report.

Comment:

Eder Associates believes that the U.S. EPA should reconsider the acceptance of any remedial action selected for the Eau Claire Well Field site with the exception of providing users of VOC contaminated private wells with an acceptable and practicable alternative water supply as soon as possible. With this exception, there is no technical basis for proceeding with the Remedial Action Plan and Design until a reevaluation of the RI/FS report and data has been carried out.

U.S. EPA Response:

Based on the above responses, the U.S. EPA feels that it is appropriate to procede with the selected remedial action alternative.

Comment:

According to National Presto Industries, Inc. (NPI), in Section 4, Paragraph 4.2.6, page 4-58 through the top of page 4-61 of the Remedial Investigation Report, and in Section 1, Paragraph 1.4.4.3, pages 1-38 through 1-40 of the Feasibility Study, incomplete factual summaries are provided regarding historical use and other informational data regarding the NPI site. The factual history is incomplete in that it "does not recite utilization of the site prior to purchase by NPI and is inaccurate with respect to factual data regarding use and investigation of the site". A proposed revised historical narrative was provided to the U.S. EPA to supplement these sections.

U.S. EPA Response:

U.S. EPA appreciates the submittal of the revised historical narrative, and has included the document in the ECMWF site administrative record. We will correct any misstated facts in our reports.

ATTACHMENT A

COMMUNITY RELATIONS ACTIVITIES CONDUCTED

AT THE EAU CLAIRE MUNICIPAL WELL FIELD SITE

Community relations activities conducted at the Eau Claire Municipal Well Field site to date include the following:

- o U.S. EPA issued a press release on April 10, 1985, announcing the availability of a Fact Sheet and the beginning of the Public Comment Period concerning the Focused Feasibility Study for the Eau Claire Municipal Well Field site (ECMWF). The public comment period was to run from April 15 to May 6, 1985.

- o Two information repositories were established near the ECMWF site on April 15, 1985.

- o Copies of the Fact Sheet were made available on April 15, 1985.

- o A press conference was held in the afternoon of April 18, 1985, announcing the status of the project.

- o U.S. EPA officials were available in the evening of April 18, 1985 to answer any questions posed by the Eau Claire residents. Although well attended by the press, and State and local officials, no other Eau Claire residents were present.

- o The community relations plan was developed in July, 1985.

- o A press release on June 13, 1985, announced that U.S. EPA had selected an Interim Remedial Measure (IRM) for the site.

- o Weekly telephone contact with the press was initiated in 1986.

- o The Fact Sheet for the IRM design phase was released in September, 1986.

- o An update to the Fact Sheet was made in August, 1987.

- o The administrative record for the ECMWF site was established in March, 1988.

- o A press release was issued and an advertisement was placed in the Eau Claire Leader Telegram announcing the beginning of the Public Comment Period on the final Feasibility Study, in March, 1988.

- o The Fact Sheet was updated and the Proposed Plan for remedial action at the ECMWF site was released on March 5, 1988.

- o The public comment period ran from March 5 to March 25, 1988.